

Notice of Allowability

Application No.

10/055,270

Examiner

Anh D. Mai

Applicant(s)

JOO ET AL.

Art Unit

2814

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to Appeal Brief filed 4/19/2004 and telephone interview initiated by the Examiner on 6/6/2005.
2. ☒ The allowed claim(s) is/are 1,2,4,6,8-15,17,19,20,25 and 30-32.
3. ☒ The drawings filed on 22 January 2002 are accepted by the Examiner.
4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☒ All b) ☐ Some* c) ☐ None of the:
 1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).
 - * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

DETAILED ACTION

Status of the Claims

1. Amendment filed June 7, 2005 has been entered. Claims 7, 18 and 24 have been cancelled. Claims 1, 13, 20 and 25 have been amended. Claims 1, 2, 4, 6, 8-15, 17, 19, 20, 25 and 30-32 are pending.

EXAMINER'S AMENDMENT

2. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Mr. Scott A. Schaffer, Reg. No. 38,610 on June 6, 2005.

The application has been amended as follows:

In the Claims:

Cancel claims 7, 18 and 24.

Claim 1, line 8: after "capacitor dielectric layer" delete "is formed of a crystalline material;" and insert:

-- includes tantalum oxide (Ta₂O₅);

subjecting the tantalum oxide (Ta₂O₅) capacitor dielectric layer to a temperature that is lower than a conventional crystallizing temperature of tantalum oxide dielectric material until crystallization of the tantalum oxide capacitor dielectric occurs; and --.

Art Unit: 2814

Claim 13, line 8: after “forming a” insert -- tantalum oxide (Ta_2O_5) -- and after “lower electrode;” delete -- and -- .

Claim 13, between lines 8 and 9, insert:

-- subjecting the tantalum oxide (Ta_2O_5) capacitor dielectric layer to a temperature that is lower than a conventional crystallizing temperature of tantalum oxide dielectric material until crystallization of the tantalum oxide capacitor dielectric occurs; and --.

Claim 20, line 8: after “tantalum oxide” insert -- (Ta_2O_5) capacitor dielectric --.

Claim 20, line 9: delete: “crystallizing the tantalum oxide layer at a crystallizing temperature;” insert instead: -- subjecting the tantalum oxide (Ta_2O_5) capacitor dielectric layer to a temperature that is lower than a conventional crystallizing temperature of tantalum oxide dielectric material until crystallization of the tantalum oxide capacitor dielectric occurs; and --.

Claim 25, line 1: delete “24” insert -- 20 --.

Claim 25, lines 1-2: delete “inherent crystallizing temperature of” insert instead -- temperature at which --.

Claim 25, lines 2-3: delete “700 °C and the crystallizing temperature of the tantalum oxide layer” insert instead -- subjected to --.

Allowable Subject Matter

3. Claims 1, 2, 4, 6, 8-15, 17, 19, 20, 25 and 30-32 are allowed.

Art Unit: 2814

4. The following is an examiner's statement of reasons for allowance: prior art of record fails to teach a method for fabricating a semiconductor device in the combination of the limitations as claimed including: forming a tantalum oxide (Ta_2O_5) capacitor dielectric layer on the pre-annealed lower electrode; and subjecting the tantalum oxide (Ta_2O_5) capacitor dielectric layer to a temperature that is lower than a conventional crystallizing temperature of a tantalum oxide dielectric material until crystallization of the tantalum oxide capacitor dielectric layer occurs.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anh D. Mai whose telephone number is (571) 272-1710. The examiner can normally be reached on 9:00AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (571) 272-1705. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR

Art Unit: 2814

system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read 'Anh D. Mai', with a long, sweeping horizontal line extending to the right.

**ANH D. MAI
PRIMARY EXAMINER**

June 8, 2005